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| 10/628,781 | 07/28/2003 | Christopher John Chuter | HESI.105897 | 4513 |

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|---|---|
| CASCHERA, ANTONIO A | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2676 | |

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/628,781 | CHUTER, CHRISTOPHER JOHN | |
| | Examiner | Art Unit | |
| | Antonio A. Caschera | 2676 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *1* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-48* is/are pending in the application.

4a) Of the above claim(s) *47 and 48* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *08/28/03, 03/04/04, 05/19/04, 02/17/05*.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *1/24/06 & 2/10/06* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 47 and 48, drawn to a computer embodied transmission signal and medium, classified in class 725, subclass 32.

   II. Claims 1-46, drawn to creating a normal map based upon object attributes, classified in class 345, subclass 584.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because Invention I does not require the particulars of creating a normal map from object attributes. The subcombination has separate utility such as providing displayable data to multiple users via a video distribution/interaction system.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with William Jensen on 02/10/06 a provisional election was made with traverse to prosecute the invention of group II, claims 1-46. Affirmation of this

election must be made by applicant in replying to this Office action. Claims 47 and 48 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### *Specification*

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract comprises the phrase, "...are disclosed..." (see line 1 of the abstract) which can be implied and therefore should be avoided. A correction to the abstract is required.

### *Drawings*

6. In response to Applicant's inquiry on the petition decision dated, 11/18/05, in regards to the drawings being, "too dark", the Examiner, hereby accepts the substitute drawings filed 06/04/04.

### *Information Disclosure Statement*

7. The information disclosure statements (IDS) submitted on 08/28/03, 03/04/04, 05/19/04 and 02/17/05 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-22, 24-43, 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kilgard, "A Practical and Robust Bump-mapping Techniques for Today's GPUs," (July 5, 2000, pp. 1-39, NVIDIA Corp.) in view of Rice (U.S. Patent 4,467,461).

In reference to claims 1, 24-27, 45 and 46, Kilgard discloses a bump-mapping technique suited for the capabilities of today's graphic processor units (see abstract, pg 1) which renders objects represented by polygonal models, these models inherently providing normal and tangent vectors at each of its' vertices (see section 5.1, 1st paragraph, pg. 17). Kilgard further discloses the vectors produced from parametric representations modeling the object (see section 5.1, 2nd paragraph, pg. 17). Kilgard discloses the normal map being made up of range-compressed normal vectors representing the perturbation of object surfaces using 2D textures (see section 5.3, 1st paragraph, pg. 18). Note, the Office interprets the map of Kilgard to inherently comprise of vertices since the maps comprise of vector data. Further note, the Office interprets that an "attribute" is represented in the texture data of Kilgard. Kilgard further discloses transforming the normal map into tangent space represented by the vectors Tn, Nn and Bn (see section 5.1, 4th-6th paragraphs, pg. 17, matrix with these vectors comprised within). Kilgard also discloses creating a light vector in tangent space using the above mentioned matrix along with a

calculating light vector in object space (see section 5.1, 5th-6th paragraphs, pg. 17). Kilgard discloses calculating bump-mapped ambient illumination based upon an equation that utilizes a normalized vector (N') (see section 2.4, 2.4.1, pgs. 4-5). Kilgard lastly discloses blending both the ambient illumination component and a diffuse illumination component to form an object's decal (see section 5.4, pg. 21, 2nd full paragraph and Figure 14). Although Kilgard discloses the normal map formed of vectors and 2D textures, these textures representing some sort of object "attribute", as interpreted by the Office, Kilgard does not explicitly disclose selecting a first attribute and a second attribute from multiple attributes. Rice discloses interactively displaying and analyzing geophysical data (see column 1, lines 7-11). Rice discloses selecting parametric attributes of geophysical data, e.g. seismic data, exploration and delineation ore body data and the like, to exhibit the selected data property in variable pixel coverage and intensity on a display (see column 1, lines 35-47). Rice particularly discloses the selected attributes ranging from amplitude, frequency, envelope (energy), phase, instantaneous velocity, etc. (see column 3, lines 14-23). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently, first and second attributes are selected from multiple attributes. Rice further discloses the selected seismic attribute "substantially" undistinguishable in its natural environment, when displayed in 3D form (see Figure 14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the selecting, analyzing and displaying of geophysical data attributes of Rice with the computer graphics bump-mapping techniques of Kilgard in order to convey multiple pieces of information to the user in a single display screen by combining different attributes together and represented graphically using different effects, therefore creating an increase in yielded information to a user

(see column 1, lines 47-54 of Rice). Further, Kilgard's techniques of bump-mapping are often associated with the displaying of geographic data which Rice is clearly directed towards. Also note in reference to claim 27, Rice discloses utilizing a computer to perform the rendering of graphical data, along with numerous memories/storage devices for storing data and also programming instructions (see column 3, lines 33-53 and Figure 4).

In reference to claims 2 and 28, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Rice particularly discloses the selected attributes ranging from amplitude, frequency, envelope (energy), phase, instantaneous velocity, etc. (see column 3, lines 14-23). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently combination of attributes are selected from multiple attributes.

In reference to claims 3 and 29, Kilgard and Rice disclose all of the claim limitations as applied to claims 2 and 28 respectively above. Rice particularly discloses the selected attributes ranging from amplitude, frequency, envelope (energy), phase, instantaneous velocity, etc. (see column 3, lines 14-23). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently, combination of attributes are selected from multiple attributes and shown together which is interpreted functionally equivalent to Applicant's "hybrid" attribute (see #66 of Figure 3 of Rice).

In reference to claims 4 and 30, Kilgard and Rice disclose all of the claim limitations as applied to claims 2 and 28 respectively above. Rice discloses selecting parametric attributes of geophysical data, e.g. seismic data, exploration and delineation ore body data and the like, to exhibit the selected data property in variable pixel coverage and intensity on a display (see

column 1, lines 35-47). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently, combination of attributes are selected from multiple attributes and shown together which is interpreted functionally equivalent to Applicant's "hybrid" attribute (see #66 of Figure 3 of Rice).

In reference to claims 5 and 31, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Although Kilgard discloses using a first texture attribute in creating the normal map and also combined with lighting components, neither Kilgard nor Rice explicitly disclose utilizing a first attribute in combination with the lighting components and a second attribute to create a normal map. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the multiple selected attributes of Rice into both the lighting and normal map creation of Kilgard. Applicant has not disclosed that combining a first attribute with a lighting component and a second attribute with normal map creation provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the texture attribute incorporation of lighting component and normal maps because utilizing multiple attributes for further calculations solely provides a greater detailed output, in the case of Kilgard and Rice, and provides no immediate criticality to the application at hand. Further support for such an interpretation, is found when comparing claim 5 to claim 6, particularly, claim 6 seems to suggest an alternate configuration of utilizing only a first attribute to combine with lighting components and normal map creation. Therefore, it would have been obvious to one of ordinary skill in this art to modify Kilgard and Rice to obtain the invention as specified in claims 5 and 31.

In reference to claims 6 and 32, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Kilgard discloses the normal map being made up of range-compressed normal vectors representing the perturbation of object surfaces using 2D textures (see section 5.3, 1st paragraph, pg. 18). Rice particularly discloses the selected attributes ranging from amplitude, frequency, envelope (energy), phase, instantaneous velocity, etc. (see column 3, lines 14-23). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently combination of attributes are selected from multiple attributes.

In reference to claims 7-10 and 33-36, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Since Rice discloses selecting multiple attributes and showing them together (see column 3, lines 14-23), the Office interprets that claims 7 and 33 are inherent in the combination of the limitations disclosed by Kilgard and Rice. These claims simply reiterate the steps taken in independent claims 1 and 27 which therefore suggests that another attribute is being shown to the user. Such a limitation of showing multiple features to the user at once is present in Rice and further is simply a repetition of already performed steps as disclosed by Kilgard and Rice. Therefore, the Office interprets that it would have been obvious to one of ordinary skill in the art at the time the invention was made to repeat the steps of Kilgard and Rice to show more data to the user in order to provide a more detailed and therefore easier to compare results, display of data to a user data analyzer.

In reference to claims 11-13 and 37, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Rice discloses displaying different

representations of the selected seismic attribute data (see Figures 10-15). Rice further discloses these representations to comprise of different planar surfaces (see Figures 10-15).

In reference to claims 14 and 38, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Kilgard further discloses the normal map comprising of three-dimensional coordinates (see section 5.1, 5th-6th paragraphs, ph. 17 and pg. 10, 2nd paragraph).

In reference to claims 15 and 39, Kilgard and Rice disclose all of the claim limitations as applied to claims 14 and 38 respectively above. Kilgard discloses the normal map being made up of range-compressed normal vectors representing the perturbation of object surfaces using 2D textures (see section 5.3, 1st paragraph, pg. 18). Kilgard also discloses the vectors derived using a cross-product calculation of x, y, z components of the normal map (see section 2.6.3, 1st-5th paragraphs).

In reference to claim 16, Kilgard and Rice disclose all of the claim limitations as applied to claim 1 above. Kilgard discloses the normal map being made up of range-compressed normal vectors representing the perturbation of object surfaces using 2D textures (see section 5.3, 1st paragraph, pg. 18). Kilgard also discloses the vectors derived using a cross-product calculation of x, y, z components of the normal map (see section 2.6.3, 1st-5th paragraphs). Rice discloses utilizing a computer to perform the rendering of graphical data, along with numerous memories/storage devices for storing data and also programming instructions (see column 3, lines 33-53 and Figure 4).

In reference to claims 17 and 18, Kilgard and Rice disclose all of the claim limitations as applied to claim 1 above. Kilgard further discloses the use of register combiners for calculating

diffuse and ambient lighting components mixed with normal map texture data (see pg. 20, starting at 4th paragraph- item #7).

In reference to claims 19 and 40, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Although Rice discloses displaying and analyzing geophysical data, neither Kilgard nor Rice explicitly disclose the attributes being of medical data type. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the techniques of Kilgard to operate upon medical data instead of the geophysical data of Rice. Applicant has not disclosed that explicitly operating upon medical data provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the geophysical data of Rice because the exact type of data utilized does not provide for an immediate criticality to the invention at hand. Even further support for such an interpretation can be found in Applicant's specification (see "Background of the Invention") wherein Applicant discloses that one possible way to utilize the invention would be geared towards the medical field while another would be geared towards the earth sciences field. Therefore, it would have been obvious to one of ordinary skill in this art to modify Kilgard to obtain the invention as specified in claims 19 and 40.

In reference to claims 20 and 41, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Rice discloses interactively displaying and analyzing geophysical data (see column 1, lines 7-11).

In reference to claims 21 and 42, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Kilgard discloses utilizing a constant color as the

ambient illumination value (see #2 of pg. 20 and Figure 10, "Constant 0" & "Constant 1" input registers).

In reference to claims 22 and 43, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Kilgard further discloses calculating a specular lighting component from a tangent space perturbed normal map and then register combing the component with other lighting components from previous combining stages and the texture attributes provided from within the normal map (see section 5.5, pgs. 21-22).

9. Claims 23 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kilgard, "A Practical and Robust Bump-mapping Techniques for Today's GPUs," (July 5, 2000, pp. 1-39, NVIDIA Corp.), Rice (U.S. Patent 4,467,461) and further in view of Parghi et al. (U.S. Patent 6,396,495 B1).

In reference to claims 23 and 44, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Neither Kilgard nor Rice explicitly disclose applying an imaginary light source to the image however Parghi et al. does. Parghi et al. discloses synthesizing image data in a virtual set using a virtual light source which is interactively repositioned relative to a line of sight of the image (see columns 5-6, lines 11-15 and Figure 6). Note, in reference to Figure 6, after the lighting is rearranged, process flows back up to repeat the calibration of the light sources, the loading of image and production of output data (see Figure 6, #605-609). Such flow would be similar when combining Parghi et al. to Kilgard and Rice. It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the lighting techniques of Parghi et al. with the analyzing and displaying of geophysical data attributes of Rice with the computer graphics bump-mapping

techniques of Kilgard in order to provide a virtual reality representation of geophysical data, producing lighting effects which further improve the overall look and feel of the virtual representation (see column 1, lines 34-43 of Parghi et al.).

### *References Cited*

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

a. Cabral et al. (U.S. Patent 5,949,424)

- Cabral et al. discloses a method, system and program for shading an object by bump mapping.

b. Repin et al. (U.S. Patent 6,940,507 B2)

- Repin et al. discloses a volume rendering process for improving the visual quality of images produced by rendering and displaying volumetric data.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Antonio A. Caschera whose telephone number is (571) 272-7781. The examiner can normally be reached on Mon-Fri 7:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on (571) 272-7691. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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